CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE LOWER CLINCH RIVER WATERSHED

5.1. BACKGROUND. The Watershed Approach relies on participation at the federal, state, local and nongovernmental levels to be successful. Two types of partnerships are critical to ensure success:

- Partnerships between agencies
- Partnerships between agencies and landowners

This chapter describes both types of partnerships in the Lower Clinch River Watershed. The information presented is provided by the agencies and organizations described.

5.2. FEDERAL PARTNERSHIPS.

5.2.A. Natural Resources Conservation Service. The Natural Resources Conservation Service (NRCS), an agency of the U.S. Department of Agriculture, provides technical assistance, information, and advice to citizens in their efforts to conserve soil, water, plant, animal, and air resources on private lands.

Performance Results System (PRS) is a Web-based database application providing USDA Natural Resources Conservation Service, conservation partners, and the public fast and easy access to accomplishments and progress toward strategies and performance. The PRS may be viewed at http://prms.nrcs.usda.gov/prs. From the opening menu, select "Reports" in the top tool bar. Next, select "2004 Reports" if it's active, and "2003 PRMS Reports" if it's not. Pick the conservation treatment of interest on the page that comes up and reset the date to 2004 Reports if it is not set there. Pick the conservation practice of interest. In the location drop box of the page that comes up, select "Tennessee" and click on the "Refresh" button. In the "By" drop box that comes up, select "Hydrologic Unit" and click on the "Refresh" button. The report of interest can now be viewed.

The data can be used to determine broad distribution trends in service provided to customers by NRCS conservation partnerships. These data do not show sufficient detail to enable evaluation of site-specific conditions (e.g., privately-owned farms and ranches) and are intended to reflect general trends.

CONSERVATION PRACTICE	TOTAL	
	FEET	ACRES
Pest Management		17

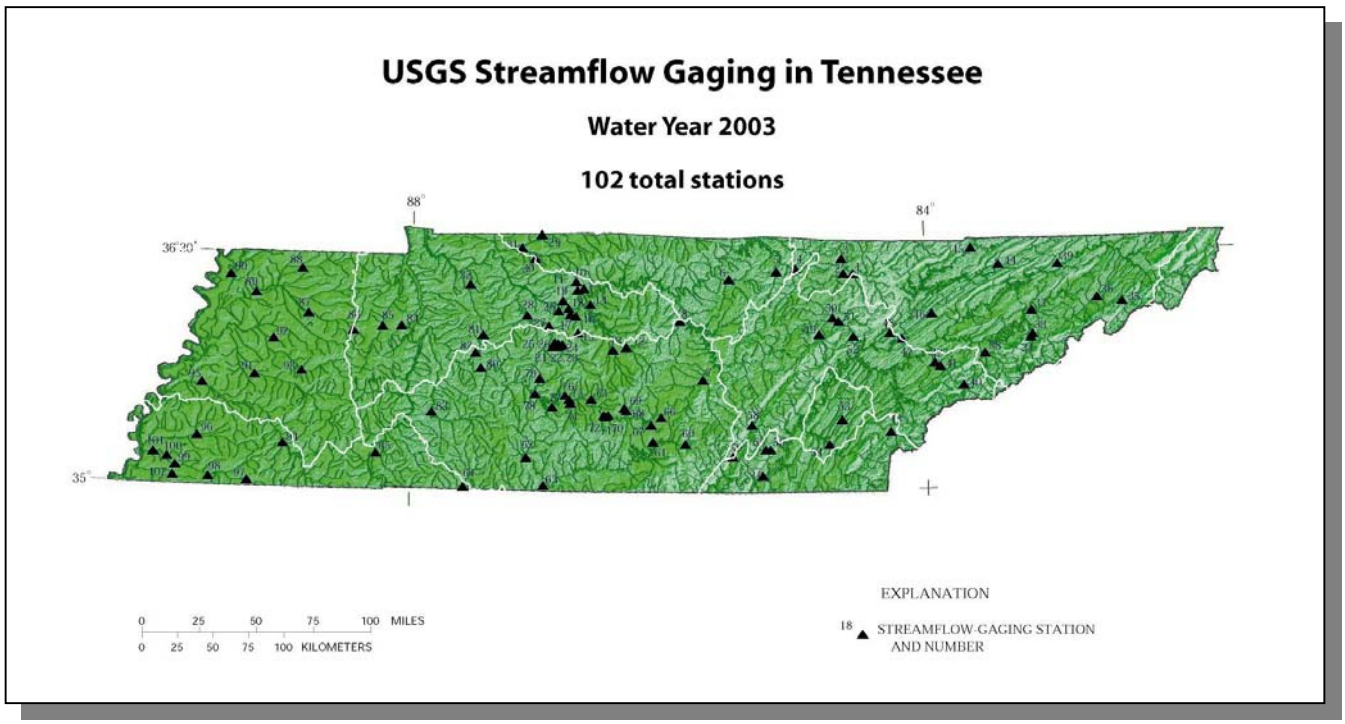
Table 5-1. Landowner Conservation Practices in Partnership with NRCS in the Lower Clinch River Watershed. *Data are from PRMS for October 1, 2003 through September 30, 2004 reporting period. More information is provided in Appendix V.*

5.2.B. United States Geological Survey Water Resources Programs – Tennessee District The U.S. Geological Survey (USGS) provides relevant and objective scientific studies and information for public use to evaluate the quantity, quality, and use of the Nation's water resources. In addition to providing National assessments, the USGS also conducts hydrologic studies in cooperation with numerous Federal, State, and local agencies to address issues of National, regional, and local concern. Please visit http://water.usgs.gov/ for an overview of the USGS, Water Resources Discipline.

The USGS collects hydrologic data to document current conditions and provide a basis for understanding hydrologic systems and solving hydrologic problems. In Tennessee, the USGS records streamflow continuously at more than 102 gaging stations equipped with recorders and makes instantaneous measurements of streamflow at many other locations. Ground-water levels are monitored Statewide, and the physical, chemical, and biologic characteristics of surface and ground waters are analyzed. USGS activities also include the annual compilation of water-use records and collection of data for National

baseline and water-quality networks. National programs conducted by the USGS include the National Atmospheric Deposition Program (http://bqs.usgs.gov/acidrain/), National Stream Quality Accounting Network (http://water.usgs.gov/nasqan/), and the National Water-Quality Assessment Program (http://water.usgs.gov/nawqa/). For specific information on the Upper and Lower Tennessee NAWQA studies, please visit http://tn.water.usgs.gov/lten/tenn.html

USGS Water Resources Information on the Internet. Real-time and historical streamflow, water levels, and water-quality data at sites operated by the Tennessee District can be accessed at http://waterdata.usgs.gov/tn/nwis/nwis. Data can be retrieved by county, hydrologic unit code, or major river basin using drop-down menus. Contact Donna Flohr at (615) 837-4730 or dfflohr@usgs.gov for specific information about streamflow data. Recent publications by the USGS staff in Tennessee can be accessed by visiting http://tn.water.usgs.gov/pubpg.html. This web page provides searchable bibliographic information to locate reports and other products about specific areas.



5.2.C. U.S. Fish and Wildlife Service. The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. Sustaining our nation's fish and wildlife resources is a task that can be accomplished only through the combined efforts of governments, businesses, and private citizens. The U.S. Fish and Wildlife Service (Service) works with State and Federal agencies and Tribal governments, helps corporate and private landowners conserve habitat, and cooperates with other nations to

halt illegal wildlife trade. The Service also administers a Federal Aid program that distributes funds annually to States for fish and wildlife restoration, boating access, hunter education, and related projects across America. The funds come from Federal excise taxes on fishing, hunting, and boating equipment.

Endangered Species Program

Through the Endangered Species Program, the Service consults with other federal agencies concerning their program activities and their effects on endangered and threatened species. Other Service activities under the Endangered Species Program include the listing of rare species under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended: 16 U.S.C. 1531 et seq.) and the recovery of listed species. Once listed, a species is afforded the full range of protections available under the ESA, including prohibitions on killing, harming or otherwise taking a species. In some instances, species listing can be avoided by the development of Candidate Conservation Agreements, which may remove threats facing the candidate species, and funding efforts such as the Private Stewardship Grant Program. The Federally endangered gray bat (*Myotis grisescens*) occurs in this reach of the Clinch River watershed. For a complete listing of endangered and threatened species in Tennessee, please visit the Service's website at http://www.fws.gov/cookeville/.

Recovery is the process by which the decline of an endangered or threatened species is stopped and reversed, and threats to the species' survival are eliminated, so that long-term survival in nature can be ensured. The goal of the recovery process is to restore listed species to a point where they are secure and self-sustaining in the wild and can be removed from the endangered species list. Under the ESA, the Service and National Marine Fisheries Service were delegated the responsibility of carrying out the recovery program for all listed species.

In a partnership with the Tennessee Nature Conservancy (TNC), Tennessee Wildlife Resources Agency (TWRA), and Tennessee Department of Environment and Conservation (TDEC) Division of Natural Heritage, the Service developed a State Conservation Agreement for Cave Dependent Species in Tennessee (SCA). The SCA targets unlisted but rare species and protects these species through a suite of proactive conservation agreements. The goal is to preclude the need to list these species under the ESA. This agreement covers middle and eastern Tennessee and will benefit water quality in many watersheds within the State.

In an effort to preclude the listing of a rare species, the Service engages in proactive conservation efforts for unlisted species. The program covers not only formal candidates, but also other rare species that are under threat. Early intervention preserves management options and minimizes the cost of recovery.

Partners for Fish and Wildlife Program

The U.S. Fish and Wildlife Service established the Partners for Fish and Wildlife Program to restore historic habitat types that benefit native fishes and wildlife. The program adheres to the concept that restoring or enhancing habitats such as wetlands or

other unique habitat types will substantially benefit federal trust species on private lands by providing food and cover or other essential needs. Federal trust species include threatened and endangered species, as well as migratory birds (e.g. waterfowl, wading birds, shorebirds, neotropical migratory songbirds).

Participation is voluntary and various types of projects are available. Projects include livestock exclusion fencing, alternate water supply construction, streambank stabilization, restoration of native vegetation, wetland restoration/enhancement, riparian zone reforestation, and restoration of in-stream aquatic habitats.

The Service is actively involved with the TNC and private landowners in the upper reaches of the Clinch River watershed to protect riparian habitats for a number of Federally listed mussel and fish species. Specific projects have included the installation of livestock exclusion fencing and alternate water supply sources.

HOW TO PARTICIPATE

- Interested landowners contact a Partners for Fish and Wildlife Biologist to discuss the proposed project and establish a site visit.
- A visit to the site is then used to determine which activities the landowner desires and how those activities will enhance habitat for trust resources. Technical advice on proposed activities is provided by the Service, as appropriate.
- Proposed cost estimates are discussed by the Service and landowner.
- A detailed proposal which describes the proposed activities is developed by the Service biologist and the landowner. Funds are competitive, therefore the proposal is submitted to the Service's Ecosystem team for ranking and then to the Regional Office for funding.
- After funding is approved, the landowner and the Service co-sign a Wildlife Extension Agreement (minimum 10-year duration).
- Project installation begins.
- When the project is completed, the Service reimburses the landowner after receipts and other documentation are submitted according to the Wildlife Extension Agreement.

For more information regarding the Endangered Species and Partners for Fish and Wildlife programs, please contact the Tennessee Ecological Services Field Office at (931)-528-6481 or visit their website at http://www.fws.gov/cookeville/.

5.2.D. Tennessee Valley Authority (TVA). Tennessee Valley Authority's goals for the 21st century are to generate prosperity for the Tennessee Valley by promoting economic development, supplying low-cost, reliable power, and supporting a thriving river system. TVA is committed to the sustainable development of the region and is engaged in a wide range of watershed protection activities. TVA has 7 multidisciplinary Watershed Teams to help communities across the Tennessee Valley actively develop and implement protection and restoration activities in their local watersheds. These teams work in partnership with business, industry, government agencies, and community groups to manage, protect, and improve the quality of the Tennessee River and its tributaries. TVA also operates a comprehensive monitoring program to provide real-time information to the Watershed Teams and other entities about the conditions of these resources. The

following is a summary of TVA's resource stewardship activities in the Lower Clinch River watershed.

Reservoir Monitoring

Reservoir Ecological Health. TVA's Reservoir Ecological Health Monitoring program is designed to provide the necessary information from five key ecological indicators (dissolved oxygen, chlorophyll, fish community, bottom life, and sediment contaminants [PCBs, Pesticides, and Metals]) to evaluate current conditions, provide data for comparing future water quality conditions, and provide for assessments as needed for current and future operations and development.

A part of this monitoring program has been to communicate the data in an easily understandable format. TVA's approach has been to use a Reservoir Ecological Health Score. The ecological health scoring process is designed such that results from each of the five indicators are evaluated based on TVA's reservoir evaluation system and assigned a rating ranging from 1 (poor) to 5 (excellent). To arrive at an overall health evaluation for a reservoir, the sum of the ratings from all sites are totaled, divided by the maximum possible rating for that reservoir, and expressed as a percentage.

TVA monitors ecological conditions at 69 sites on 31 reservoirs. The Lower Clinch watershed contains Melton Hill Reservoir and a portion of the Watts Bar Reservoir, referred to as the Clinch River arm. Melton Hill is sampled at the forebay (CRM 24.0), mid-reservoir (CRM 45.0), and inflow (CRM 59-66) stations. The Clinch River arm of Watts Bar is sampled at the inflow station (CRM 19).

TVA monitored Melton Hill Reservoir annually from 1991 to 1994 to establish baseline data on the reservoir's ecological health under a range of weather and flow conditions. Melton Hill is now evaluated every other year.

The following chart present Reservoir Ecological Health scores for each year for which data were comparable.

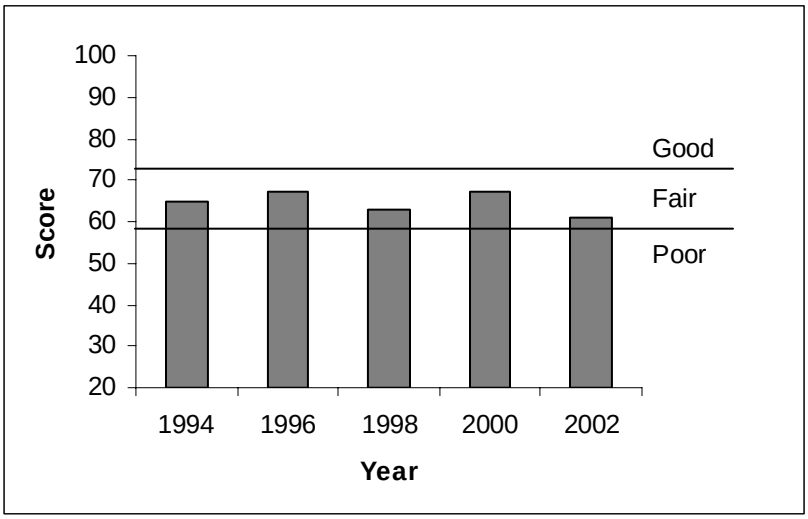


Figure 5-1. Melton Hill Reservoir Ecological Health Ratings (1994-2002)

Melton Hill Reservoir rated fair in 2002, with an overall ecological health score similar to previous years. However, significant changes have been observed for several indicators in recent years—probably the result of dry weather conditions and low reservoir flows. Drought conditions that began in the summer 1998 and continued into 2002 produced near record low flows in the Tennessee Valley. The effects of these low flow years are reflected in the mix of fair and poor ratings for dissolved oxygen and chlorophyll, which always rated good prior to 1996. Flows were below average for Melton Hill in 2002, but apparently sufficient to prevent oxygen depletion in the lower water column. Notably, chlorophyll continued to show an increase in 2002 with the highest summer average to date. TVA will continue to monitor this trend. Monitoring was conducted on Melton Hill Reservoir in 2004, however results are not yet available.

TVA has monitored Watts Bar Reservoir, including an inflow station on Clinch River arm (CRM 19) since 1991. The fish and benthic macroinvertebrate community are sampled at this station. In 2002, the fish community rated fair and benthos rated poor, similar to previous years. The fair rating for the fish community was due to low catch rates, high composition of tolerant individuals, and fair fish diversity. Benthos rated poor due to low overall density and the lack of intolerant organisms. Dissolved oxygen, chlorophyll, and sediment contaminants were not monitored at this site. Information regarding the overall health of Watts Bar Reservoir as shown by TVA's ecological indicators is available from the TVA Internet site (http://www.tva.gov).

Public and Industrial Water Supplies. Adequate water of good quality is essential for sustained population growth and economic development. In conjunction with routine water quality monitoring efforts conducted as part of Reservoir Ecological Health Monitoring, TVA collects additional water samples to be analyzed for parameters of interest to public and industrial water supplies. The purpose of these additional collections is to provide data for use in siting new water supply facilities and determining appropriate treatment design. Also, data are available to domestic water suppliers to assist in water treatment operations and diagnosis of abnormal conditions.

More information about Reservoir Ecological Health Monitoring in the Lower Clinch River watershed can be obtained by contacting Tyler Baker at (423)-876-6733 or tfbaker@tva.gov or by visiting TVA's Internet site (http://www.tva.gov).

Bacteriological sampling. Recreation is an important objective of TVA's integrated river resource management system. TVA develops, maintains, and promotes public use of several recreational sites. Increased public knowledge about bacterial contamination has heightened the interest in bacteriological levels in recreational waters by both TVA and our stakeholders. Each summer, about 250 swimming areas and informal water contact recreational sites throughout the Tennessee Valley are tested for fecal coliform and/or *Escherichia coli* (*E. coli*) bacteria by TVA's Resource Stewardship. These sites include those operated by TVA and many operated by other agencies. The site list is reexamined annually by the appropriate watershed teams and other TVA organizations to ensure the most heavily used sites are monitored.

TVA monitored five sites on or around Melton Hill Reservoir for *E. coli* in 2004. Bacteriological water sampling is conducted between Memorial Day and Labor Day when people are most likely to be recreating. Resource Stewardship conducts ten tests within a 30-day period at each site to establish a geometric mean for the indicator bacteria. The 2004 sampling locations were:

Site Name	***Location***
Melton Hill Dam Beach	Clinch RM 23.5
Clark Center (Carbide) Park Beach	McCoy Branch M 0.2, Clinch RM 37.4R
Solway Bridge Park Boat Ramp	Clinch River M 43.9R
Oak Ridge Municipal Park	Clinch RM 50.3
Gibbs Ferry Park Boat Ramp	Clinch RM 53.2

Samples collected at Melton Hill Dam beach were within the state of Tennessee's guidelines for water contact. Three sites had at least one sample with elevated bacteria levels: Clark Center (Carbide) Park beach, Solway Bridge Park boat ramp, and Gibbs Ferry Park boat ramp. One site, Oak Ridge Municipal Park, had an elevated geometric mean and exceeded the single sample maximum at least one time when compared to the state of Tennessee's guidelines for water contact. All of these sites reported the presence of waterfowl (Canada geese), either continuously or intermittently, which likely influenced the increased bacteriological concentrations. Data from this sampling effort is shared in a timely manner with TDEC's Division of Water Pollution Control.

TVA monitored 21 sites on or around Watts Bar Reservoir for *E. coli* in 2004. The Kingston City Park Beach is the only site sampled within the Lower Clinch watershed. Monitoring results for this site were within the state of Tennessee's guidelines for water contact.

Fish Flesh Toxic Contaminants. State agencies are responsible for advising the public of health risks from eating contaminated fish. TVA assists the states by collecting and analyzing fish from TVA reservoirs. TVA collected channel catfish and largemouth bass from the reservoir for tissue analysis in the autumn of 2003. Catfish were analyzed for an array of contaminants (including pesticides and PCBs). Largemouth bass were analyzed for mercury. The results have been provided to state agencies in Tennessee.

More information on bacteriological and fish tissue monitoring on Melton Hill Reservoir or Watts Bar Reservoir can be obtained by contacting Rebecca Hallman at (423)-876-6736 or rlhallman@tva.gov by visiting TVA's Internet site (http://www.tva.gov).

Stream Bioassessment

Condition of water resources in Lower Clinch River watershed streams is measured using three independent methods: Index of Biotic Integrity (IBI), number of mayfly, stonefly, and caddisfly taxa (EPT), and Habitat Assessment. Not all of these tools were used at each stream sample site

IBI. The index of biotic integrity (IBI) assesses the quality of water resources in flowing water by examining a stream's fish assemblage. Fish are useful in determining long-term (several years) effects and broad habitat conditions because they are relatively long-lived and mobile. Twelve metrics address species richness and composition, trophic structure (structure of the food chain), fish abundance, and fish health. Each metric reflects the condition of one aspect of the fish assemblage and is scored against reference streams in the region known to be of very high quality. Potential scores for each of the twelve metrics are 1-poor, 3-intermediate, or 5-the best to be expected. Scores for the 12 metrics are summed to produce the IBI for the site. The following table associates IBI ranges with attributes of fish assemblages.

Attributes	IBI Range
Comparable to the best situations without influence of man; all regionally expected species for the habitat and stream size, including the most intolerant forms, are present with full array of age and sex classes; balanced trophic structure.	58-60
Species richness somewhat below expectation, especially due to loss of most intolerant forms; some species with less than optimal abundance or size distribution; trophic structure shows some signs of stress.	48-52
Signs of additional deterioration include fewer intolerant forms, more skewed trophic structure (e.g., increasing frequency of omnivores); older age classes of top predators may be rare.	40-44
Dominated by omnivores, pollution-tolerant forms, and habitat generalists; few top carnivores; growth rates and condition factors commonly depressed; hybrids and diseased fish often present.	28-34
Few fish present, mostly introduced or tolerant forms; hybrids common; disease, parasites, fin damage, and other anomalies regular.	12-22

EPT. The number and types of aquatic insects, like fish, are indicative of the general quality of the environment in which they live. Unlike fish, aquatic insects are useful in determining short-term and localized impacts because they are short-lived and have limited mobility. The method TVA uses involves only qualitative sampling and field identification of Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) to the family taxonomic level (EPT). The score for each site is simply the number of EPT families. The higher EPT scores are indicative of high quality streams because these insect larvae are intolerant of poor water quality.

Habitat Assessment. The quality and quantity of habitat (physical structure) directly affect aquatic communities. Habitat assessments are done at most stream sampling sites to help interpret IBI and EPT results. If habitat quality at a site is similar to that found at a good reference site, any impacts identified by IBI and EPT scores can reasonably be attributed to water quality problems. However, if habitat at the sample site differs considerably from that at a reference site, lower than expected IBI and EPT scores might be due to degraded habitat rather than water quality impacts.

The habitat assessment method used by TVA (modified EPA protocol) compares observed instream, channel, and bank characteristics at a sample site to those expected at a similar high-quality stream in the region. Each of the stream attributes listed below is given a score of 1 (poorest condition) to 4 (best condition).

1. Instream cover (fish)
2. Epifaunal substrate
3. Embeddedness
4. Channel Alteration
5. Sediment Deposition
6. Frequency of Riffle
7. Channel Flow Status
8. Bank vegetation protection - Left bank and right bank, separately
9. Bank stability - Left bank and right bank, separately
10. Riparian vegetation zone width - Left bank and right bank, separately

The habitat score for the sample site is simply the sum of these attributes. Scores can range from a low of 10 to a high of 40.

Sample Site Selection. EPT and IBI assessments are conducted at the same sites. Site selection is governed primarily by study objectives, stream physical features, and stream access. TVA's objective is to characterize the quality of water resources within a watershed (11-digit hydrologic unit). Sites are typically located in the lower end of sub-watersheds and at intervals on the mainstem to integrate the effects of land use. A total of 29 sites are sampled in the Lower Clinch drainage. These sites are typically sampled every five years to keep a current picture of watershed condition.

Tailwater Health

In addition to stream and river assessments, TVA conducts assessments in selected tailwater areas to evaluate the success of minimum flow and dissolved oxygen augmentations as part of TVA's Reservoir Release Improvement program. These

evaluations are based on the same three stream components used in stream assessments – IBI, EPT, and habitat assessment. As part of the Reservoir Release Improvement (RRI) program, TVA uses autoventing turbines to improve the quality of water released from Norris Dam. This innovative technology efficiently introduces air flow into low-pressure zones just below the turbines to create many small air bubbles. A re-regulating weir is also used below Norris to provide additional aeration and to maintain a minimum flow of water downstream between periods of hydroelectric generation. This process helps to prevent riverbed dry-out and provides additional habitat for fish and other aquatic life.

The RRI program has improved the dissolved oxygen concentrations and minimum flow levels in Norris tailwaters. However tailwater temperatures remain unnaturally cold and mostly unsuitable for native fish communities. Since 1993, TVA's tailwater monitoring data has consistently shown poor ratings for fish and benthos. Monitoring has been conducted yearly since 2002 at three Clinch River tailwater locations (CRM 77, CRM 70.5, and CRM 66.7). Non-native cold water sport fish, such as rainbow trout and brown trout, have been introduced and thrive in Norris tailwater.

Details about stream bioassessment sampling sites and scores can be obtained by writing Charles Saylor at Tennessee Valley Authority, PO Box 920, Ridge Way Road, Norris, TN 37828 or calling him at (865)-632-1779. Email address is cfsaylor@tva.gov.

WATERSHED ASSISTANCE

Coalition Support: Citizen Based Organizations

Citizen based watershed organizations can play a critical role in watershed protection. TVA's watershed teams work to strengthen these organizations by providing assistance in the areas of understanding the local watershed, its conditions, impacts, and threats; developing and implementing strategies to protect or improve resource quality; fundraising; river issues; and organizational development. In 1999, TVA initiated a series of workshops for watershed organizations. Past workshops have covered, state and federal water quality protection programs, grant writing, fund raising, communication/outreach and strategic planning.

Beaver Creek Watershed Association was organized in 2003 to protect and enhance the natural and human environment of the Beaver Creek watershed through the mobilization of public support, build public awareness and promote Best Management Practices (BMPs). TVA has assisted them in producing a quarterly newsletter, developing an exhibit that can be moved around the watershed, producing information/educational signage for a Halls Greenway wetland and publishing an educational brochure about wetlands. Future plans include sampling sediment from construction sites, implementing a recognition program for contractor's who have installed stormwater management BMPs on their construction sites, building membership and participating in other water improvement projects. For more information, go to http://www.bvrcrk.org.

Bullrun Creek Watershed Association was organized in 2004 by concerned citizens of the community to protect, enhance and preserve the natural environment of the Bullrun Creek watershed. TVA helped them produce a brochure about their organization.

Meetings are currently being held once a month. They hope to become involved in community education, trash cleanups and water monitoring and would like to produce a portable exhibit about the watershed. For more information, e-mail inquires to bullruncreek@frontiernet.net.

Tennessee Citizens for Wilderness Planning (TCWP) is dedicated to achieving and perpetuating protection of natural lands and waters. TCWP has worked with TVA for the past 5 years in removing evasive exotic plant species from the Worthington Cemetery Ecological Study Area on Melton Hill Reservoir. Once the non-natives are removed, native plants are planted in their place. For more information, visit http://tcwp.org/.

Coal Creek Watershed Foundation is a non-profit organization organized in 2000 with a mission to improve the quality of life in the Coal Creek watershed. They are working as volunteers with government agencies and other partners to effect change by combining the intellectual resources of engineers/scientists in East Tennessee with the common sense of the residents from the Coal Creek watershed. TVA assists them with education activities and streambank restoration and stabilization projects. Visit http://www.coalcreekaml.com for more information.

Coalition Support: Inter-agency Partnerships

The benefits of watershed partnerships are well documented. No one unit of government, agency, group or individual has all the knowledge, expertise or resources to address all watershed issues. Partnerships can tap a diversity of energy, talent, and ideas. Watershed partnerships can also promote a more efficient use of limited financial and human resources and can identify innovative and efficient means of improving or protecting water quality. The Watts Bar-Clinch Watershed Team participates in several inter-agency partnerships in this area.

Water Quality Forum (WQF), established in 1990, is a cooperative network of agencies, nonprofit organizations and citizens working to improve the health of the waterways in East Tennessee in accordance with the goals of the Clean Water Act. TVA was one of the 9 founding members. The Forum has initiated or participates in the following projects and activities: Adopt-a-Watershed; Kids-in-the-Creek; Adopt-a-Stream; River Rescue; WaterFest; Environmental Stewardship Program; Sediment and Erosion Control BMP workshops; and Clean, and Protect and Restore Day. For more information, visit http:www.waterqualityforum.org.

Beaver Creek Task Force formed in 1999 to coordinate improvement efforts in the Beaver Creek Watershed, a rapidly urbanizing watershed located in Knox County. The Task Force has developed an inventory of the watershed's natural and cultural resources, sponsored a public meeting to inform Beaver Creek residents about resource conditions and obtain public input into future watershed improvement activities, assisted a group of watershed residents in forming the Beaver Creek Watershed Association, and created a native plant arboretum along a section of the greenway. A proposal requesting approximately $500,000 to stabilize stream banks, restore or enhance riparian buffers and wetlands, install agricultural BMPs, create in-stream habitat, manage storm water, and remove debris dams along a five mile section of Beaver Creek has been approved

by the Tennessee Stream Mitigation Program Selection Committee. The Task Force has begun development of a long-range plan for the watershed.

Bullrun Creek Restoration Initiative is an inter-agency partnership formed to address water quality problems in the Bullrun Creek watershed flowing through Grainer, Union, Knox, and Anderson counties. Partners have assessed water resource conditions, identified pollution sources, developed an Integrated Pollution Source Identification system to plan and manage water quality improvement projects, sponsored stakeholder meetings to hear the concerns of watershed residents and gage support for the restoration initiative, developed a watershed video, fact sheet, internet site, and newsletters to educate stakeholders and keep them informed about the initiative, and sponsored annual farm tours to demonstrate and promote conservation practices. In 2002 a calendar was produced that featured farm practices that can make your farm water friendly. They also were instrumental in helping a group of citizens form the Bullrun Creek Watershed Association. Using TVA funds and some from Quail Unlimited, the Initiative purchased a no-till drill for use in the watershed to implement pasture improvement projects; the Knox County Soil Conservation District has agreed to store the equipment, maintain it and manage its use. Over 15,000 feet of streambank in the watershed has benefited from BMPs or will soon benefit.

Hinds Creek Partnership is focused on improving water quality and community awareness of water quality issues. Recent streambank restoration projects have stabilized approximately 450 feet of streambank, fenced off 1000 feet of stream and planted 3 riparian acres with native seedlings. TVA and TDEC have implemented a water quality monitoring project. A farm tour to highlight agricultural BMPs is planned for 2005.

Outreach

TVA supports several programs to educate and engage Lower Clinch River watershed stakeholders in water quality improvement and protection activities.

National Clean Boating Campaign. The National Clean Boating Campaign is a partnership program that highlights the importance of clean water so boating will continue to be fun and safe for future generations. The program demonstrates how boaters can be good stewards of their water environment through best boating and marina practices. TVA sponsors this program on all of it's reservoirs including Melton Hill and Watts Bar.

Clean Marina Initiative. The Tennessee Valley Clean Marina Initiative is an effort by TVA to promote environmentally-responsible marina practices. This voluntary program, established in support of the National Clean Boating Campaign, helps marina operators protect the resource that provides them with their livelihood.

WaterFest. WaterFest is an annual festival designed to educate youth about the many values of water. WaterFest was initiated in 1995 by the WQF and has grown into an event with hundreds of elementary and middle school children attending from across Knox County.

Tennessee Growth Readiness Initiative. The Tennessee Growth Readiness Initiative (TGRI) is an educational program developed by TVA to teach local officials, and other decision makers about the sources and impacts of nonpoint source pollution, how different land uses affect water quality, and what communities can do to protect water quality. Knox County served as the pilot area for TGRI. TVA also assisted Knox County partners in convening a Site Planning Roundtable, a diverse committee that included representatives of county, city and state government agencies, environmentalists, lawyers, bankers, developers, builders and homeowners. The Roundtable reached consensus on recommended changes to development rules and processes. Funding for development of TGRI was obtained through a 319(h) grant.

Kids-in-the-Creek. This annual event is done in conjunction with Adopt-A-Watershed, a program implemented in Knox County middle and high schools to encourage students to investigate and improve the health of their school's watershed. In order to help students understand the importance of our creeks and streams we let them spend a day in a nearby creek collecting fish and bugs and learning about nonpoint source pollution, where it comes from and how it can impact the water.

Protection and Restoration Activities

The partners in this area are involved in numerous activities that are designed to protect and restore the targeted watersheds. For example, public meetings are organized and held to gain input from landowners about their concerns and to share information; newsletters and brochures are produced to present the issues and outline possible solutions; articles are printed in local newspapers, web sites are developed and tire dumps are cleaned up; and windshield surveys are made to become familiar with the watershed and identify sensitive areas.

Promote Best Management Practices. TVA provides funding and technical expertise to assist with instillation of BMPs that will reduce non-point pollution. TVA also works with partners to promote use of BMPs. Recent studies have shown that poorly managed pasture land is a major contributor to poor water quality. Efforts are now being targeted to pasture improvement BMPs. Cost share funds are available though several state and federal programs.

Environmental Stewardship Program. The Environmental Stewardship Program is a cooperatively sponsored cost-share program that allows Knox County organizations and citizens' access to professional expertise and funding required to implement environmentally friendly solutions to urban nonpoint source pollution problems. These solutions include using vegetation and soil bioengineering to stabilize stream banks, and grassy swales to collect stormwater runoff and absorb pollutants. Projects also serve as educational opportunities for landscape professionals, contractors, engineers and public works/utility maintenance crews by illustrating how water quantity and erosion problems can be solved while providing tangible benefits to water quality.

Clean, Protect and Restore (CPR) is an annual effort lead by Community Action Committee AmeriCorps Water Quality Team in conjunction with its WQF partners to remove trash from Knox County's streams. CPR has been held each year since 1995.

In total, CPR has removed over 166 tons of trash from Knox County's waterways (includes Beaver Creek and part of Bullrun Creek watersheds).

Adopt-A-Stream is a program whose goal is to increase public sensitivity to awareness of the importance of the miles of creeks, streams and rivers in Knox County and to restore health to those waterways damaged by people or nature.

Promote Riparian Buffers. An effective line of water quality protection is maintaining the vegetative plant cover along waterbodies. TVA encourages waterfront property owners to maintain or establish vegetated riparian buffers by providing information and materials to the riparian property owner. In 2004, TVA partnered with the Beaver Creek Task Force and Halls High School to deliver riparian seedlings to creek-side property owners in the watershed. Packages of 30 native riparian plant seedlings were distributed to riparian property owners in the watershed. Seedlings were also distributed to landowners in Bullrun Creek watershed through our partners with the Soil Conservation Districts. TVA has also developed a series of 11 fact sheets that will enable riparian property owners to restore, manage and be better stewards of riparian land (http://www.tva.com/river/landandshore/index.htm).

Integrated Pollution Source Identification System. Integrated Pollution Source Identification (IPSI) system is a GIS database and set of analysis tools developed by TVA environmental engineers and remote sensing specialists to help plan and implement watershed restoration efforts. IPSI is based on interpretation of color infrared photography. In 2003, IPSI systems were completed for Bullrun Creek watershed. This project was made possible by funding from The TVA. IPSI is being used to identify water quality impacts and target improvement efforts and is being considered for the Beaver Creek watershed for 2005.

Further information on TVA's Watershed Assistance activities in the Lower Clinch River watershed can be obtained by writing the Watts Bar-Clinch Watershed Team at: Tennessee Valley Authority, 2007 Grubb Road Lenoir City, TN 37771 or calling (865)-988-2440.

5.3. STATE PARTNERSHIPS.

5.3.A. TDEC Division of Water Supply. The Source Water Protection Program, authorized by the 1996 Amendments to the Safe Drinking Water Act, outline a comprehensive plan to achieve maximum public health protection. According to the plan, it is essential that every community take these six steps:

1) Delineate the drinking water source protection area
2) Inventory known and potential sources of contamination within these areas
3) Determine the susceptibility of the water supply system to these contaminants
4) Notify and involve the public about threats identified in the contaminant source inventory and what they mean to their public water system
5) Implement management measures to prevent, reduce or eliminate threats
6) Develop contingency planning strategies to deal with water supply contamination or service interruption emergencies (including natural disaster or terrorist activities).

Source water protection has a simple objective: to prevent the pollution of the lakes, rivers, streams, and ground water (wells and springs) that serve as sources of drinking water before they become contaminated. This objective requires locating and addressing potential sources of contamination to these water supplies. There is a growing recognition that effective drinking water system management includes addressing the quality and protection of the water sources.

Source Water Protection has a significant link with the Watershed Management Program goals, objectives and management strategies. Watershed Management looks at the health of the watershed as a whole in areas of discharge permitting, monitoring and protection. That same protection is important to protecting drinking water as well. Communication and coordination with a multitude of agencies is the most critical factor in the success of both Watershed Management and Source Water Protection.

Watershed management plays a role in the protection of both ground water and surface water systems. Watershed Management is particularly important in areas with karst (limestone characterized by solution features such as caves and sinkholes as well as disappearing streams and spring), since the differentiation between ground water and surface water is sometimes nearly impossible. What is surface water can become ground water in the distance of a few feet and vice versa.

Source water protection is not a new concept, but an expansion of existing wellhead protection measures for public water systems relying on ground water to now include surface water. This approach became a national priority, backed by federal funding, when the Safe Drinking Water Act amendments (SDWA) of 1996 were enacted. Under this Act, every public drinking water system in the country is scheduled to receive an assessment of both the sources of potential contamination to its water source of the threat these sources may pose by the year 2003 (extensions were available until 2004). The assessments are intended to enhance the protection of drinking water supplies within existing programs at the federal, state and local levels. Source water

assessments were mandated and funded by Congress. Source water protection will be left up to the individual states and local governments without additional authority from Congress for that progression.

As a part of the Source Water Assessment Program, public water systems are evaluated for their susceptibility to contamination. These individual source water assessments with susceptibility analyses are available to the public at http://www.state.tn.us/environment/dws as well as other information regarding the Source Water Assessment Program and public water systems.

For further discussion on ground water issues in Tennessee, the reader is referred to the Ground Water Section of the 305(b) Water Quality Report at:

http://www.state.tn.us/environment/water.htm.

The intent of this report is to provide the public with an overall characterization of ground water quality and hydrogeology for Tennessee.

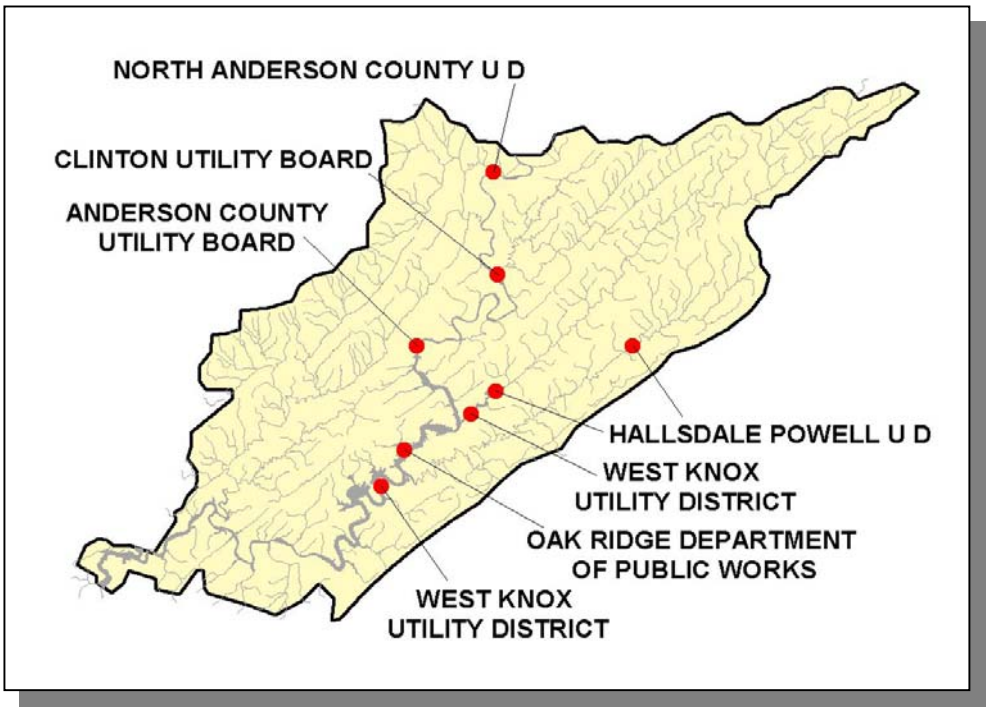


Figure 5-2. Locations of Community and Non-Community Public Water Supply Intakes in the Lower Clinch River Watershed.

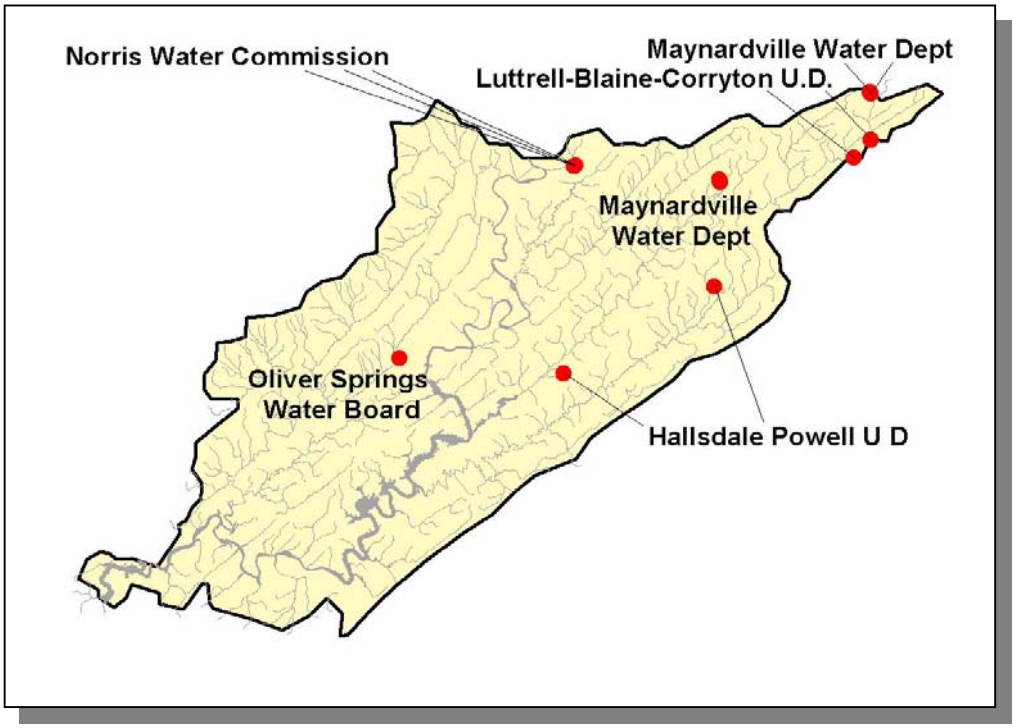


Figure 5-3. Locations of Community and Public Groundwater Supply Intakes in the Lower Clinch River Watershed.

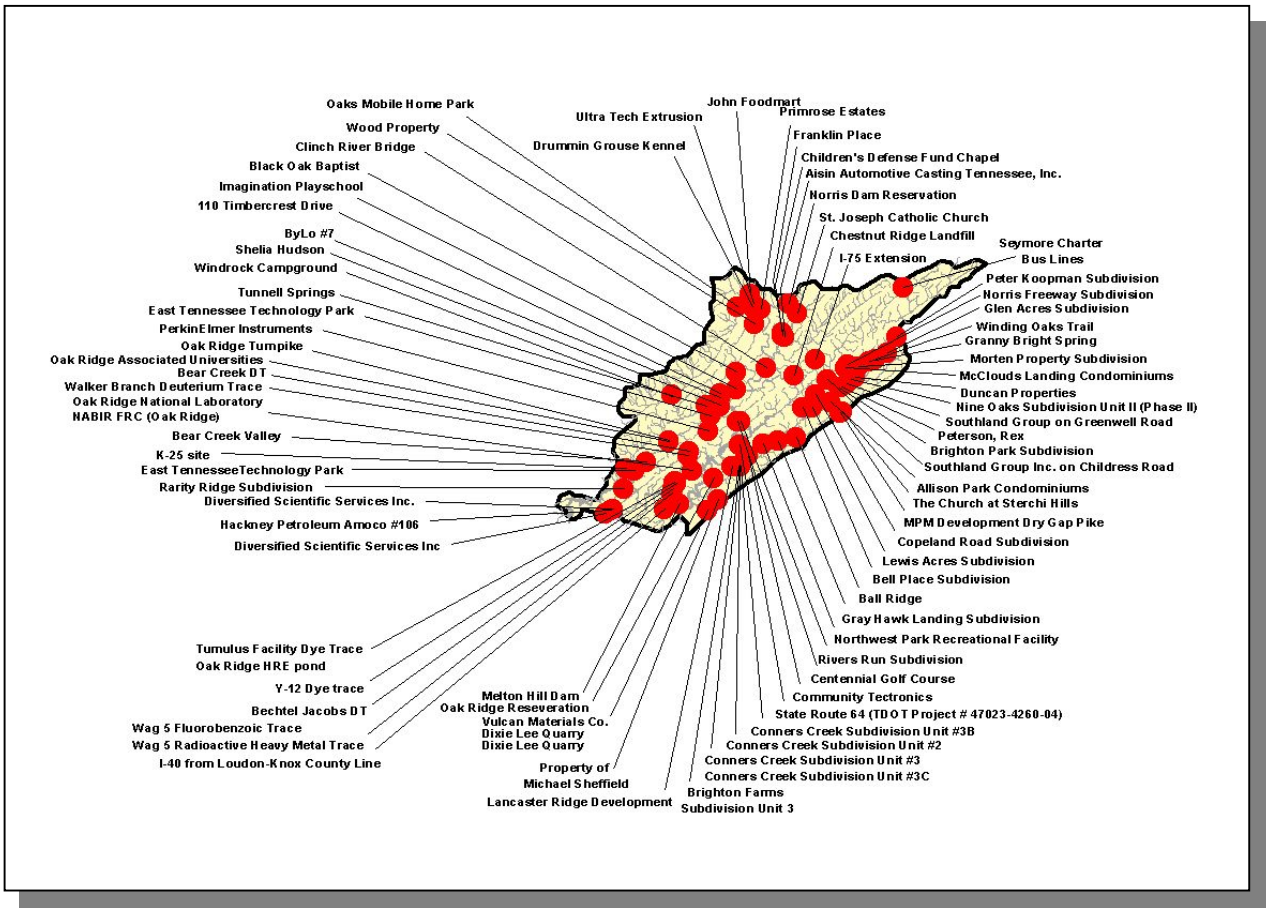


Figure 5-4. Locations of UIC (Underground Injection Control) Sites in the Lower Clinch River Watershed. *Injection wells include stormwater sinkholes modified for drainage, commercial/industrial septic tanks, and large capacity septic tanks.*

5.3.B. TDEC Division of Community Assistance. The Division of Community Assistance administers the state's Clean Water State Revolving Fund Program. Amendment of the Federal Clean Water Act in 1987 created the Clean Water State Revolving Fund (SRF) Program to provide low-interest loans to cities, counties, and utility districts for the planning, design, and construction of wastewater facilities. The U.S. Environmental Protection Agency awards annual capitalization grants to fund the program and the State of Tennessee provides a twenty-percent funding match. The Division of Community Assistance has awarded loans totaling approximately $675 million since the creation of the SRF Program. SRF loan repayments are returned to the program and used to fund future SRF loans.

SRF loans are available for planning, design, and construction of wastewater facilities, or any combination thereof. Eligible projects include new construction or upgrading/expansion of existing facilities, including wastewater treatment plants, pump

stations, force mains, collector sewers, interceptors, elimination of combined sewer overflows, and nonpoint source pollution remedies.

SRF loan applicants must pledge security for loan repayment, agree to adjust user rates as needed to cover debt service and fund depreciation, and maintain financial records that follow governmental accounting standards. SRF loan interest rates range from zero percent to market rate, depending on the community's per-capita income, taxable sales, and taxable property values. Most SRF loan recipients qualify for interest rates between 2 and 4 percent. Interest rates are fixed for the life of the term of the loan. The maximum loan term is 20 years or the design life of the proposed wastewater facility, whichever is shorter.

The Division of Community Assistance maintains a Priority Ranking System and Priority List for funding the planning, design, and construction of wastewater facilities. The Priority Ranking List forms the basis for funding eligibility determinations and allocation of Clean Water SRF loans. Each project's priority rank is generated from specific priority ranking criteria and the proposed project is then placed on the Project Priority List. Only projects identified on the Project Priority List may be eligible for SRF loans. The process of being placed on the Project Priority List must be initiated by a written request from the potential SRF loan recipient or their engineering consultant. SRF loans are awarded to the highest priority projects that have met SRF technical, financial, and administrative requirements and are ready to proceed.

Since SRF loans include federal funds, each project requires development of a Facilities Plan, an environmental review, opportunities for minority and women business participation, a State-approved sewer use ordinance and Plan of Operation, and interim construction inspections.

For further information about Tennessee's Clean Water SRF Loan Program, contact the Division of Community Assistance by telephone at (615) 532-0445 or visit their Web site at http://www.state.tn.us/environment/dca.

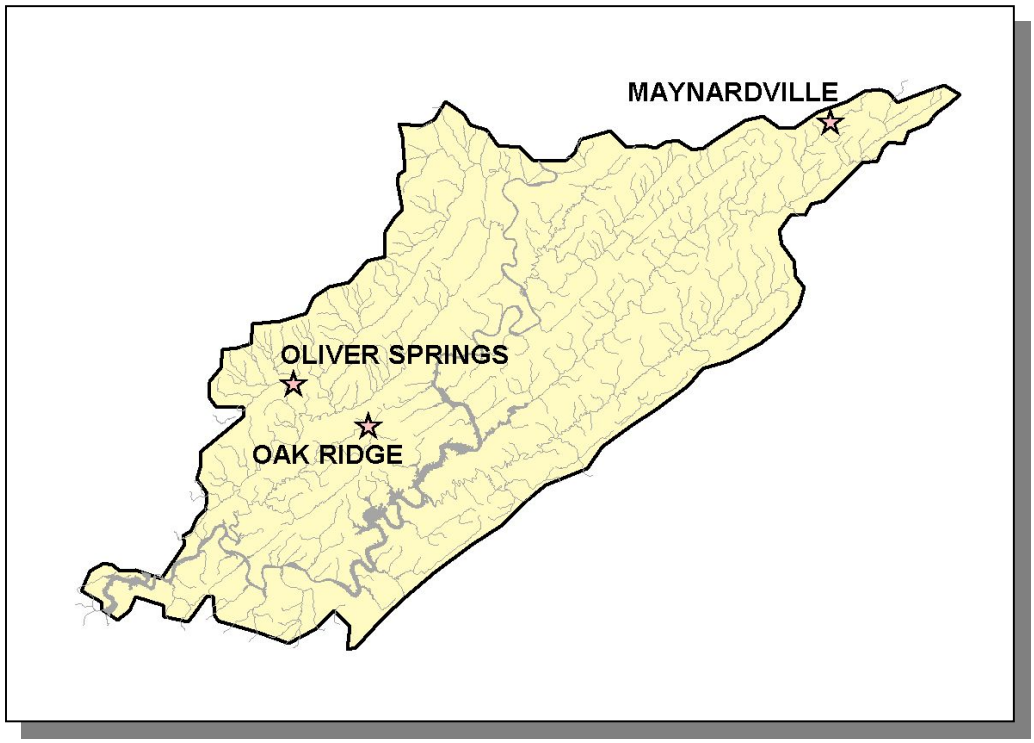


Figure 5-5. Location of Communities Receiving SRF Loans or Grants in the Lower Clinch River Watershed. *More information is provided in Appendix V.*

5.3.C. Tennessee Department of Agriculture. The Tennessee Department of Agriculture's Water Resources Section consists of the federal Section 319 Nonpoint Source Program and the Agricultural Resources Conservation Fund Program. Both of these are grant programs which award funds to various agencies, non-profit organizations, and universities that undertake projects to improve the quality of Tennessee's waters and/or educate citizens about the many problems and solutions to water pollution. Both programs fund projects associated with what is commonly known as "nonpoint source pollution."

The Tennessee Department of Agriculture's Nonpoint Source Program (TDA-NPS) has the responsibility for management of the federal Nonpoint Source Program, funded by the US Environmental Protection Agency through the authority of Section 319 of the Clean Water Act. This program was created in 1987 as part of the reauthorization of the Clean Water Act, and it established funding for states, territories and Indian tribes to address NPS pollution. Nonpoint source funding is used for installing Best Management Practices (BMPs) to stop known sources of NPS pollution, training, education, demonstrations and water quality monitoring. The TDA-NPS Program is a non-regulatory program, promoting voluntary, incentive-based solutions to NPS problems. The TDA-NPS Program basically funds three types of programs:

- BMP Implementation Projects. These projects aid in the improvement of an impaired waterbody, or prevent a non-impaired water from becoming listed on the 303(d) List.

- Monitoring Projects. Up to 20% of the available grant funds are used to assist the water quality monitoring efforts in Tennessee streams, both in the state's 5-year watershed monitoring program, and also in performing before-and-after BMP installation, so that water quality improvements can be verified. Some monitoring in the Lower Clinch River Watershed was funded under an agreement with the Tennessee Department of Agriculture, Nonpoint Source Program (U.S. Environmental Protection Agency Assistance Agreements C9994674-00-0, C9994674-01-0, and C9994674-02-0).

- Educational Projects. The intent of educational projects funded through TDA-NPS is to raise the awareness of landowners and other citizens about practical actions that can be taken to eliminate nonpoint sources of pollution to the waters of Tennessee.

The Tennessee Department of Agriculture Agricultural Resources Conservation Fund Program (TDA-ARCF) provides cost-share assistance to landowners across Tennessee to install BMPs that eliminate agricultural nonpoint source pollution. This assistance is provided through Soil Conservation Districts, Resource Conservation and Development Districts, Watershed Districts, universities, and other groups. Additionally, a portion of the TDA-ARCF is used to implement information and education projects statewide, with the focus on landowners, producers, and managers of Tennessee farms and forests.

Participating contractors in the program are encouraged to develop a watershed emphasis for their individual areas of responsibility, focusing on waters listed on the Tennessee 303(d) List as being impaired by agriculture. Current guidelines for the TDA-ARCF are available. Landowners can receive up to 75% of the cost of the BMP as a reimbursement.

Since January of 1999, the Department of Agriculture and the Department of Environment and Conservation have had a Memorandum of Agreement whereby complaints received by TDEC concerning agriculture or silviculture projects would be forwarded to TDA for investigation and possible correction. Should TDA be unable to obtain correction, they would assist TDEC in the enforcement against the violator. More information forestry BMPs is available at:
http://tennessee.gov/agriculture/forestry/BMPs.pdf, and the complaint form is available at: http://tennessee.gov/environment/wpc/logform.php.

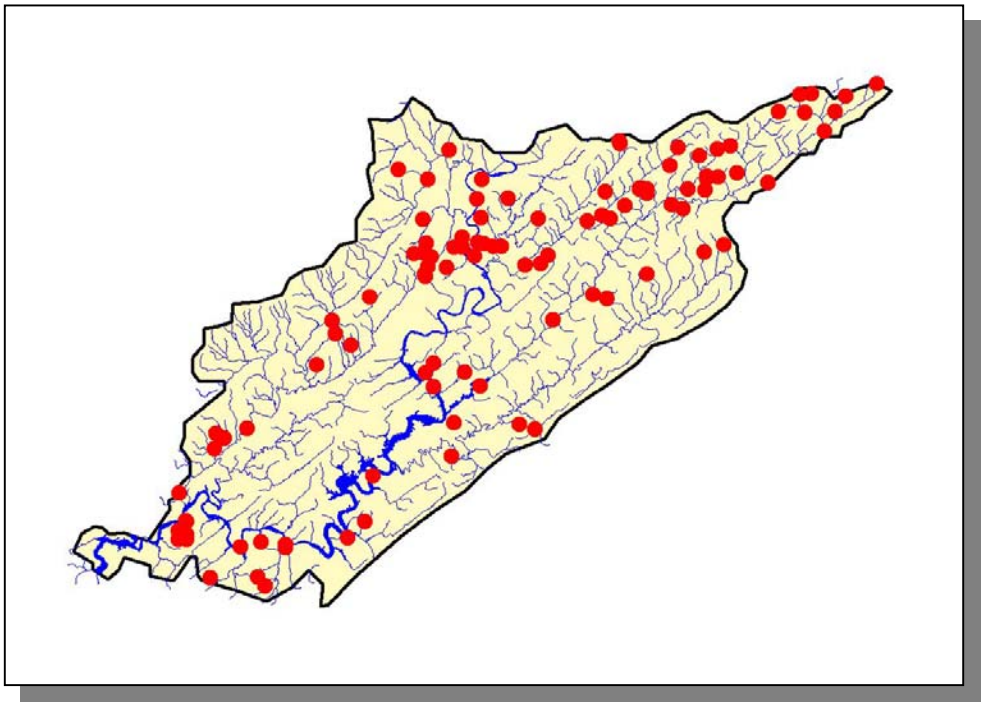


Figure 5-6. Location of BMPs installed from 1999 through 2003 in the Lower Clinch River Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs. *More information is provided in Appendix V.*

5.3.D. DOE-Oversight. The Tennessee Department of Environment and Conservation, DOE Oversight Division under terms of the Tennessee Oversight Agreement, conducts environmental monitoring on the Clinch River. Chemical and radiological emissions in the water, biota, and sediment on the Oak Ridge Reservation and surrounding environs are emphasized. The goal is to assure that DOE Oak Ridge Operations have no adverse impact to public health, safety, or the environment. Results from this monitoring and the findings of the quality and effectiveness of the DOE's environmental programs are reported in an annual status report. Annual environmental monitoring report is also provided each spring that details the technical results of these studies may be found at: http://www.state.tn.us/environment/doeo/active.php

5.4. LOCAL INITIATIVES.

5.4.A. Clinch River Chapter of Trout Unlimited. Trout Unlimited is a national natural resources conservation organization. Its mission is to conserve, protect and restore cold water (trout and salmon) habitats. The Clinch River tailwater extends about 13-miles from Norris Dam to the Highway 61 Bridge at Clinton. The river supports an excellent trout fishery featuring rainbow and trophy brown trout; it is one of the finest trout fisheries in the East.

The Clinch River Chapter has over around 100 members, most of whom live in and around the Anderson County communities of Oak Ridge, Clinton and Norris. The mission of the Chapter is to conserve and protect the Clinch River tailwater.

The Chapter was established in 1994 and has worked on numerous projects to enhance the fishery. The following are some of the projects the Chapter has initiated:

- Taking the lead in establishing the Coal Creek Watershed Foundation.
- Sponsoring annual shoreline and road cleanups; and conducting annual river cleanups that to date have removed over 5,000 tires and a large amount of other debris from the river channel and tributaries.
- Establishing a mile-long demonstration bank stabilization project to prevent shoreline erosion and improve fish and wildlife habitat.
- Establishing a biological monitoring program with partners TVA and TWRA.

For its efforts in these and other projects, the Chapter was awarded Trout Unlimited's second highest conservation award in 2001, the Silver Trout Award. In 2004, Chapter member Carol Moore was awarded Trout Unlimited's Volunteer Conservationist of the Year Award.

The Clinch River Chapter supports the watershed approach to protecting our streams and is working hard to support the Coal Creek Watershed Foundation. The Chapter looks forward to the day when the quality of life for residents of the Coal Creek watershed will be significantly improved; and when the large volumes of sediment that flow from Coal Creek into the Clinch tailwater during major rain events are mitigated through erosion control projects.

More information about Clinch River Chapter of Trout Unlimited activities may be found at http://www.crctu.com/

5.4.B. Beaver Creek Watershed Association. The Beaver Creek Watershed Association was formed in March 2003 and currently consists of about 200 members. It is chartered in Tennessee as a non-profit corporation and operates as a 501(c)(3) organization under IRS regulations. The organization's members are spread throughout the northern

sections of Knox County, including the communities of Gibbs, Halls, Powell, Karns, and Hardin Valley/Solway.

In recent years many residents of the watershed have expressed growing concerns about issues such as suburban sprawl, flooding, pollution of Beaver Creek, destruction of farms and forests, absence of dedicated greenspace, and highway construction. Not only do residents wish to see problems alleviated, but they want to see positive things accomplished. Our local officials and elected representatives are responsible for certain matters, but citizens must take a lead role in bringing about positive actions. That's what BCWA is all about.

Briefly put, our mission is to protect and enhance the natural and human environment of the Beaver Creek Watershed. We want to spearhead our communities' efforts to manage how they grow. If we want to have livable communities that reflect residents' desires for pleasant surroundings, less congestion, more greenspace and wildlife refuges, a cleaned-up Beaver Creek, and greater appreciation and preservation of community values and identities, then we need residents in the watershed to join together to accomplish these objectives.

BCWA has a number of projects underway. We are rehabilitating a marsh adjoining the new Halls library and working with the school board to reclaim a suburban brownfield and turn it into an outdoor classroom for a high school. The Tennessee Valley Authority has provided us with funds to develop signage and education brochures for the marsh. Hallsdale-Powell Utility District has provided BCWA with funds and an engineering consultant to accomplish these projects as well. BCWA members have worked with the local Adopt-a-Watershed and Adopt-a-Stream programs in portions of the watershed. A project is underway with the World Wildlife Fund to measure sediment runoff from construction projects to establish some idea of the amount of burden being experienced by Beaver Creek and its tributaries. BCWA has contributed limited funds to two local schools for projects and distributes information brochures and newspaper supplements to local residents. With TVA support, the Association distributes periodic newsletters about the BCWA and watershed issues to two thousand residents who live on Beaver Creek. The Association also hopes to initiate a land trust that can hold title to conservation easements in the Beaver Creek Watershed.

More information about the Beaver Creek Watershed Association is available by mail at: P.O. Box 652/Powell, TN 37849, and at the Beaver Creek Watershed Association web site: http://www.bvrcrk.org

5.4.C. Beaver Creek Task Force. The Beaver Creek Watershed is the southernmost watershed in the Lower Clinch Basin. It's 86 square miles lies entirely within the northern portion of Knox County. The 44 miles of main stem plus seven main tributaries wind through five different communities before emptying into the Clinch River. Beaver Creek is a rapidly urbanizing watershed and the creek is 303(d) listed by the State of Tennessee. The primary impacts to Beaver Creek include sediment, nutrients, and pathogens from agricultural and urban runoff; nutrients and pathogens from municipal point sources; and habitat alteration due primarily to land development.

Formed in 1998 the Beaver Creek Task Force's (BCTF) mission is to bring together public and private institutions to implement a program to protect and enhance the natural and human environments of the Beaver Creek Watershed. Members of the Task force come from local, state, and federal agencies with participation of the local utility districts and the Beaver Creek Watershed Association. A partial listing includes: AMEC, Beaver Creek Watershed Association, Hallsdale Powell Utility Company, Knox County Engineering and Public Works Stormwater Management Division, Knox County Parks and Recreation, Knox County Soil Conservation District, Knox Land and Water Conservancy, Knoxville/Knox County Metropolitan Planning Commission, Knoxville/Knox County Utilities Board Geographic Information System, Tennessee Valley Authority, Tennessee Department of Environment and Conservation, USDA National Resources Conservation District, and the University of Tennessee Water Resources Research Center.

Initially, the BCTF conducted an assessment of the Beaver Creek Watershed to inventory resources and to identify problem areas. After a round of public meetings the data was assembled into a report and published in 2003. This study will help Knox County plan more effectively for flood control, water quality, and the allocation of land for open space, recreation, and trails. During the assessment process a FEMA flood study was conducted on the creek. The results of this flood study were used by Knox County to adopt a new Stormwater Ordinance that expanded the no build/no fill zone in the Beaver Creek floodplain. The assessment report is also being used as an educational/outreach tool by the task force and has been distributed to local and state leaders.

Also in 2003, the BCTF assisted in the formation of the Beaver Creek Watershed Association and is partnering with them on a number of educational and restoration projects. At the same time the Task Force obtained a grant from the Tennessee Valley Authority that was used to hire a Watershed Coordinator for Knox County to primarily focus on the Beaver Creek Watershed.

In addition, BCTF partners have published a 16 page tabloid on Beaver Creek that was distributed to stakeholders as inserts in local newspapers; partnered with the University of Tennessee Water Resource Research Center to get the Adopt-A-Watershed Program into six watershed high schools and middle schools; and partnered with the Hallsdale Powell Utility District with its traveling environmental education program for elementary schools in the watershed.

In addition to these ongoing efforts the BCTF has turned its recent focus to preparing a comprehensive Watershed Restoration Plan, assisting TDEC in its data collection for the TMDL for Beaver Creek, and looking for restoration opportunities in the watershed. In the summer of 2004 the BCTF presented a proposal to the Tennessee Stream Mitigation Program to restore a five-mile reach of Beaver Creek. The $500,000 project was accepted and is now in its beginning stages.

Through its current and future efforts the Beaver Creek Task Force envisions the Beaver Creek Watershed as a desirable place to live, with its beautiful vistas and open spaces protected, its waters wadeable and fishable, and its floodplain returned to its natural function of storing waters during high flows. It envisions vibrant communities that are distinct in history and culture yet united by the valley corridor. Communities will have

access to Beaver Creek and its tributaries to recreate and reflect so that they may be better able to appreciate its ecology and be inspired to preserve and protect it through their own actions.

Web Site: http://www.waterqualityforum.org

Contact Information for the Beaver Creek Task Force Executive Committee

Chris Granju Knox County Department of Engineering And Public Works Stormwater Management chris.granju@knoxcounty.org	865-215-5840
Karen Nolt Knox County Department of parks and Recreation Karen.nolt@knoxcounty.org	865-215-6610
Tom McDonough Tennessee Valley Authority tamcdono@tva.org	865-988-2483
Tim Gangaware University of Tennessee Water Resources Research Center gangwrrc@utk.edu	865-974-4777
Roy Arthur Knox County Department of Engineering and PW Watershed Coordinator rarthurroy@aol.com	865-755-9053

5.4.D. Coal Creek Watershed Foundation. The dream of the Coal Creek Watershed Foundation, Inc. (CCWF) was born in February 2000 during a drive along Coal Creek. The original goal of CCWF simply was to make Coal Creek and its tributaries suitable trout-spawning habitat. In order to improve the water quality, acid mine drainage from the abandoned coalmine lands in the Coal Creek watershed needs to be abated. There is rich coal mining history in this area that can be seen at http://www.coalcreekaml.com/Legacy.htm. The intention of CCWF was to perform a simple community service project using the group's engineering skills, thereby performing the work required to apply for a grant from the Office of Surface Mining (OSM) to reclaim abandoned mine land.

However, acid mine drainage is not the only problem in the Coal Creek watershed. Meetings with various groups, government agencies, and local residents revealed that while improving water quality would be welcome, every group had a goal of its own. The residents are primarily concerned with the quality of life for their children—better schools, adequate dental and health care, opportunities for jobs, safety from flooding, and education. Many parents have heard their children say they will leave the Coal

Creek watershed because "there is nothing here for me." As the groups joined together, the CCWF's goal broadened to "improving the quality of life in the Coal Creek watershed."

Since February 2000, CCWF has been building the human infrastructure needed to accomplish their mission. Volunteers and agencies have jumped on board. At the first public event in Coal Creek, citizens posted protest signs. Now, they write songs about the volunteers and the ladies cook for them on work days. The accomplishments of CCWF are too vast to describe in full detail here; however they can be found at http://www.coalcreekaml.com.

Coal Creek Water Quality. OSM has monitored the water quality of Coal Creek and the results have shown the water quality is not as bad as once thought. Mother Nature has helped with the recovery from the coal mining that was done before the strict regulations went into effect in 1977. Sampling results can be seen at:

http://www.coalcreekaml.com/OSMsamplingthruAugust2003.pdf.

For information on abandoned mine land reclamation lessons, visit:

http://www.coalcreekaml.com/MineReclamationLessons.htm.

We have learned that the main problem in Coal Creek is sediment. Coal Creek flows into the Clinch River. If you are driving north on Interstate 75 and look over the side of the bridge that travels over the Clinch River, you can see where Coal Creek flows into the Clinch. Especially after a rain, it looks like a plume of chocolate milk is entering the river out of Coal Creek. To test this theory, storm samplers were installed throughout the Coal Creek Watershed. Sampling results are showing the sediment as predicted. We plan to take another sampling when there is a large rain event after a drought period to compare to the results that have been collected. This is an on-going process.

For more information on the Coal Creek Watershed, contact Carol Moore at (865)-584-0344 or clmoore@geoe.com. Visit the web page at http://www.coalcreekaml.com.

5.4.E. Hinds Creek Watershed Partnership. The Hinds Creek Watershed Partnership is comprised of local, state, and federal partners working to protect and improve water quality throughout the watershed. While areas of Hinds Creek watershed are being developed, much of the watershed remains in agriculture. The partnership has focused much of its efforts working with local landowners to develop comprehensive farm management plans and implement agricultural best management practices (BMPs) that can benefit the landowner and improve water quality. Many practices, such as pasture renovation, cattle exclusion fencing, and alternative watering systems, can be funded through conservation programs administered by local Soil Conservation Districts and Natural Resource and Conservation Services. The Partnership is also involved in a cooperative water quality monitoring project with TDEC and is working to perform comprehensive watershed assessments. Gathering information regarding the health of the watershed will help prioritize areas of work, as well as help obtain funding for watershed improvements. Future plans include a community meeting to provide

stakeholders an opportunity to voice concerns and learn about Hinds Creek watershed and a demonstrational agricultural BMP farm tour.

For more information about the Hinds Creek Watershed Partnership, please contact Tiffany Foster at tlfoster@tva.gov.

5.4.F. Oak Ridge Reservation Local Oversight Committee. The Oak Ridge Reservation (ORR) Local Oversight Committee (LOC) is a non-profit, regional organization representing the interests of local governments and their citizens with respect to U.S. Department of Energy's (DOE) environmental decisions on the ORR. The LOC was formed in 1991 when the state of Tennessee signed an oversight agreement with DOE to independently monitor ORR environmental restoration and waste management activities. Its purpose is to allow local government and citizen input into decisions by the DOE on environmental and other activities that affect local jurisdictions. Information can be found at the website http://www.local-oversight.org or call toll-free (888)-770-3073.

The initial major concern was the discharge of radioactive and hazardous contaminants from the ORR into the Clinch River. The primary sources were the Bethel Valley and Melton Valley waste storage and disposal sites that drained into the White Oak Creek embayment and the Y-12 and K-25 plants that contributed contamination to Poplar Creek. Studies of the water, biota, and sediments of Watts Bar Reservoir documented that PCBs were the most problematic contaminant, but cesium-137 also persists in buried sediments and mercury in some fish. The studies resulted in issuance of a fish advisory due to PCBs in certain gamefish from Watts Bar Reservoir, which had a serious impact on the tourism industry of downstream counties. Of other significant contaminants, ongoing releases from the ORR include tritium and strontium-90, however these are soluble and pass through the lake system.

Over the years, the LOC and its Citizens' Advisory Panel (CAP) have undertaken projects and outreach related to downstream contamination from the ORR. The Watts Bar Reservoir Fish Advisory study was a special project of the CAP in conjunction with state and federal agencies to address concerns of the counties on Watts Bar Reservoir regarding the effects of PCB contamination on fishing and other recreational activities. Publication of the brochure resulted from a multi-organizational effort to address the fears of residents and tourists regarding the warning signs posted around Watts Bar Reservoir. The organizations that worked to create and review the brochure were Agency for Toxic Substances and Disease Registry (ATSDR), LOC and CAP, Tennessee Department of Environment and Conservation, Tennessee Wildlife Resources Agency, and Tennessee Department of Health.

The CAP reviewed the protocols and assisted with advertising, outreach, and educating potential participants in a study conducted by ATSDR in the late 1990s. Blood samples were taken from 116 fishermen who regularly ate their catches; the serum was tested for PCBs and mercury. PCBs levels were elevated in five people and nondetectable in 46. Regarding mercury, one person had a high mercury level and 89 had no detectable mercury. The remaining samples indicated contamination levels similar to those found in the general population and lower than expected for such fish consumers.

The Chairman of the CAP produced a study titled "Signs of Stewardship" which investigated the fate of warning signs posted on Lower East Fork Poplar Creek. The

CAP also provided independent oversight of DOE's drinking water sampling effort at East Tennessee Technology Park (the former K-25 site).

The LOC continues to provide outreach on its downstream activities, including presentations to groups concerned with watershed issues, such as the Tellico Village Homeowners Association. It also sponsors the annual "State of East Fork Poplar Creek Address" a presentation that details the improvements in the health of this contaminated tributary stream.

5.4.G. Tennessee Citizens for Wilderness Planning. TCWP is dedicated to achieving and perpetuating protection of natural lands and waters by means of public ownership, legislation, or cooperation of the private sector. While the group's first focus is on the Cumberland and Appalachian regions of east Tennessee, its efforts may extend to the rest of the state and the nation. TCWP's strength lies in researching information pertinent to an issue, informing and educating its membership and the public, interacting with groups having similar objectives, and working through the legislative, administrative, and judicial branches of government on the federal, state, and local levels. TCWP publishes a bi-monthly newsletter that has been called one of the most informative conservation newsletters in the country.

TCWP's activities contribute to protection of the Lower Clinch Watershed, as the group engages in current, local issues and ongoing projects. TCWP is a steward with TVA of the Worthington Cemetery/Cedar Barren on the Clinch River in Oak Ridge. With Advocates for the Oak Ridge Reservation (AFORR) and Tennessee Wildlife Resources Agency (TWRA), TCWP sponsors public hikes on areas such as the Three Bends of the Oak Ridge Reservation to help raise public appreciation for these sensitive, undeveloped areas that contribute to Lower Clinch water quality protection. With AFORR, TCWP is an advocate for natural resource protection in proposed actions on the Oak Ridge Reservation. TCWP has hosted public meetings for discussions regarding proposed TVA actions, such as the Watts Bar Land Plan.

In November 2002, TCWP raised funds and purchased from Bowater nearly 50 acres of land abutting TVA's White's Creek Small Wild Area. This land is an essential buffer for the SWA, since the entire Bowater tract was placed on the market. The new acreage is being donated to TVA. TCWP maintains a trail on the SWA and plans an additional trail on the new land.

For more information, visit the TCWP web site at http://tcwp.org/ or contact Jimmy Groton, TCWP Vice-President and Chair of Water Issues Committee, (865)-483-5799.